

# Bat Activity in Response to Thinning and Burning in the Appalachians

With the sharp decline in cave-hibernating bats as the result of White-nose Syndrome (WNS), there is great interest in learning about how bats respond to forest management activities, including prescribed fire. Two new papers focus on bats in Appalachian oak forests managed with thinning and prescribed fire. Both studies monitored bat activity with bat detectors that record echolocation calls.

In the Allegheny Plateau of southern Ohio (Zaleski and Richland Furnace State Forests), Silvis and others (2016) monitored bat activity in three types of stands: untreated controls, shelterwood harvest (50% and 70% retention), and shelterwood harvest with fire. The most common species detected were eastern red bats and big brown bats, followed by the *Myotis* plus tri-colored bat species group that are being heavily impacted by WNS. Like other studies in a variety of forest types, the authors found that total bat activity was significantly greater in the more open-structured stands that had received a shelterwood harvest – this included the eastern red bat, big brown bat, and the *Myotis*/tri-colored group. In shelterwood stands that were cut more heavily (50% retention) and burned, the activity of eastern red bats was reduced in the summer after the prescribed fire was conducted. The authors speculated that a reduction in moth abundance may have limited red bat activity. However, across all treatments, bat activity was greater in the partially harvested stands (with or without fire) than in the untreated control stands.

Further south, in the Cumberland Plateau of eastern Tennessee (Catoosa Wildlife Management Area), Cox and others (2016) studied bat activity and insect abundance after woodland restoration treatments that employed thinning and prescribed fire. Their study took place in shortleaf pine-oak stands that had been heavily impacted by a pine bark beetle outbreak in 1999-2000, which eliminated much of the shortleaf. They compared bat activity and insect abundance in unburned control stands (90 ft<sup>2</sup> of BA per acre) with that in stands that were thinned to 60 or 30 ft<sup>2</sup> of BA and then burned. Groups that included the big brown bat and the eastern red bat were the most commonly detected, and tricolored bats were also fairly common. Similar to the Ohio study, they found that stands that were thinned, and in this case all thinned stands were burned, had the greatest levels of bat activity, particularly the stands that were thinned down to 30 ft<sup>2</sup> BA. Insect numbers did not differ across treatments, so the authors concluded that thinning and burning did not have a significant impact on prey abundance. Further analyses showed that the increased bat activity was largely the result of reduced “clutter” after thinning and burning.

Although the Ohio study showed a decrease in eastern red bat activity immediately after the prescribed fire, taken together, the two studies found that bat activity was substantially greater in open stands than in closed stands. While these studies suggest that prescribed fire may not be necessary to increase bat activity in the short-term, which thinning alone can accomplish, fire is an effective tool to maintain the open structure that supports increased bat activity and fire also favors oak regeneration.

## Link to articles:

Silvis, A., Gehrt, S.D. and Williams, R.A., 2016. Effects of shelterwood harvest and prescribed fire in upland Appalachian hardwood forests on bat activity. *Forest Ecology and Management*, 360, pp.205-212.

<https://doi.org/10.1016/j.foreco.2015.10.010>

Cox, M.R., Willcox, E.V., Keyser, P.D. and Vander Yacht, A.L., 2016. Bat response to prescribed fire and overstory thinning in hardwood forest on the Cumberland Plateau, Tennessee. *Forest Ecology and Management*, 359, pp.221-231.

<https://doi.org/10.1016/j.foreco.2015.09.048>

